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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,750	05/15/2007	Van Suong Hoa	789-100	1088

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J. Rodman Steele  
Novak Druce & Quigg LLP  
525 Okeechobee Blvd  
Suite 1500  
West Palm Beach, FL 33401

EXAMINER
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FEELY, MICHAEL J

ART UNIT	PAPER NUMBER
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1796

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/596,750	<b>Applicant(s)</b> HOA ET AL.	
	<b>Examiner</b> Michael J. Feely	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-25 is/are rejected.
- 7) ☒ Claim(s) 1-25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20060925, 20070515</u> .                                      | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Pending Claims***

Claims 1-25 are pending.

### ***Priority***

1. The instant application is a national stage entry of PCT/CA04/02184, filed December 22, 2004, which claims priority to US provisional application no. 60/531,618, filed December 23, 2003.

- Claims 1, 3-9, and 11-19 are fully supported by the provisional application; accordingly, they have an effective filing date of December 23, 2003.
- Claims 2, 10, and 20-25 are not fully supported by they provisional application. These claims are also not fully supported by the international application. In light of this, it appears that this application may in fact be a continuation-in-part of the international application. Claims 2, 10, and 20-25 have an effective filing date of May 15, 2007.

### ***Specification***

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

- The particle size limitation of claims 2, 20 (*and dependent claims 21-25*) is not supported by the instant specification (*see paragraph 0053*), the international application (*see paragraph 0053*), or the provisional application (*see paragraph 0046*). In light of this, it

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appears that claim 2 should be amended to replace “dimension in a micrometer range” with --dimension in a nanometer range--. Such a change would overcome the objection to the specification and give claims 2, 20, 21, and 23-25 full priority back to the provisional application.

- The range limitation of claims 10 and 22 is not supported by the instant specification (*see paragraph 0100*), the international application (*see paragraph 0100*), or the provisional application (*see paragraph 0080*). In light of this, it appears that claims 10 and 22 should be amended to replace “up to 2 and 8 times respectively” with --2 and 3 times respectively--. Such a change would overcome the objection to the specification and give claims 10 and 22 full priority back to the provisional application.

### ***Claim Rejections - 35 USC § 101/35 USC § 112***

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 25 provides for the use of the modified epoxy according to claim 21, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

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Claim 25 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

***Claim Rejections - 35 USC § 102/103***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 20-22, 24, and 25 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Drzal et al. (US 2005/0119371). Note: Drzal et al. claims priority to US provisional application 60/511,258, which fully supports the cited portions of the pre-publication.

Regarding claims 20-22, 24, and 25, Drzal et al. disclose: **(20 & 22)** a modified epoxy produced from a pristine epoxy comprising: solvent (paragraphs 0011, 0080, 0098), nano-clay

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particles (paragraphs 0011, 0080, 0098), and pristine epoxy (paragraphs 0011, 0080, 0098), wherein clay particles of nano-dimensions are finely and homogeneously distributed in the modified epoxy (paragraphs 0011, 0080, 0098); **(21)** comprising finely dispersed clay agglomerates of less than about 1  $\mu\text{m}$  and agglomerates of a maximum diameter between about 1  $\mu\text{m}$  and 2  $\mu\text{m}$  (paragraphs 0011, 0080, 0098); **(24)** further comprising additives (paragraph 0098: *modified clay*); and **(25)** a use of the modified epoxy according to claim 21 for making components for parts used in a field selected in the group consisting of aircraft industry, automobile industry, sport equipment manufacturing, adhesive and sealant manufacturing, wood products, coatings and for manufacturing of components for pipes, boats and reservoirs (paragraphs 0081, 0086, 0094).

Drzal et al. form their dispersion by: (a) creating a solution of solvent, nano-clay, and epoxy; and (b) sonicating the solution. Accordingly, Drzal et al. fail to disclose the claimed steps of: (1) mixing solvents and clay particles of a dimension in a micrometer (*nanometer*) range into a clay solution; (2) submitting the clay solution to high pressure gradient between input and output to generate a high flow velocity, shearing flow and breaking impacts of the particles in a region of obstacles; (3) then submitting the clay solution to a lower pressure, yielding a dispersed clay particles solution; and (4) mixing the dispersed clay particles solution with at least part of the pristine epoxy.

However, it should be noted that the instant claims are provided in product-by-process format. In light of this, it has been found that, “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product

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in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process,” – *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (*see MPEP 2113*).

Therefore, it appears that the instantly claimed modified epoxy is the same or an obvious variation of the one set forth in Drzal et al. because the final product of Drzal et al. satisfies all of the material/chemical limitations of the instant invention.

Further regarding claims 20 and 22, Drzal et al. fail to explicitly disclose: **(20)** the modified epoxy having at least higher barrier properties and thermal resistance than the pristine epoxy; and **(22)** wherein a content of clay agglomerates at about 1 wt % of clay loading yield an increase in a fracture toughness, with an increase in  $K_{IC}$  and  $G_{IC}$  of up to 2 and 8 (*2 and 3*) times with respect to the pristine epoxy respectively. However, it appears that the composition of Drzal et al. would have inherently satisfied these property limitations because they satisfy all of the material/chemical limitations of the instant invention.

In light of this, it has been found that, “Products of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that the composition of Drzal et al. would have inherently satisfied these property limitations because they satisfy all of the material/chemical limitations of the instant invention.

***Claim Rejections - 35 USC § 103***

9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drzal et al. (US 2005/0119371) in view of Furihata (US Pat. No. 4,465,542).

Regarding claim 23, the teachings of Drzal et al. are as set forth above and incorporated herein. Drzal et al. desire toughness and flexibility in their composition; however, they fail to explicitly disclose: **(23)** wherein said pristine epoxy is a rubber-modified epoxy.

The teachings of Furihata demonstrate rubber materials are recognized in the art as suitable additives for epoxy/clay compositions that require toughness and flexibility (*see Abstract; column 6, lines 37-53*). In light of this, it has been found that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination – *see MPEP 2144.07*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add rubber to the composition of Drzal et al. because the teachings of Furihata demonstrate rubber materials are recognized in the art as suitable additives for epoxy/clay compositions that require toughness and flexibility.

***Claim Objections***

10. Claims 1-25 are objected to because of the following informalities:

Independent claims 1, 14, and 20 are drawn to: (1) a method of making a modified epoxy, (14) an apparatus for making modified epoxy, and (20) a modified epoxy (*product-by-process*). However, there are a few minor inconsistencies among these claims, related to the process



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parameters. The following is suggested claim language to diminish these inconsistencies.

Appropriate correction is required.

**(I)** A method for making a modified epoxy, comprising the steps of:

a) mixing solvents and clay particles, of a dimension in the nanometer range, to form a clay solution;

b) generating a flow of clay solution and submitting said flow to: (1) high pressure to generate high velocity and to allow shearing in the clay solution to occur; (2) a region of obstacles allowing breaking impacts of the clay particles; and (3) a sudden lower pressure, yielding a dispersed clay solution having a fine and homogeneous distribution of clay particles in the clay solution; and

c) mixing the dispersed clay solution with at least a pristine epoxy.

**(14)** An apparatus for making modified epoxy from a pristine epoxy, comprising:

a) a first container for preparing a solution of clay particles;

b) a device for dispersing the solution of clay particles; and

c) a second container for mixing the dispersed solution of clay particles with the pristine epoxy;

wherein said device for dispersing the solution of clay particles comprises: (1) a first section for submitting a flow of the solution of clay particles to high pressure, to generate high velocity and to allow shearing in the clay solution to occur; (2) a second section of obstacles allowing breaking impacts of the clay particles; and (3) a pressure-collapse chamber to provide a sudden lower pressure, yielding a dispersed clay solution having a fine and homogeneous distribution of clay particles in the clay solution.

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(17) cancel.

(20) A modified epoxy produced from a pristine epoxy, the modified epoxy having at least higher barrier properties and thermal resistance than the pristine epoxy, the modified epoxy produced by:

a) mixing solvents and clay particles, of a dimension in the nanometer range, to form a clay solution;

b) generating a flow of clay solution and submitting said flow to: (1) high pressure to generate high velocity and to allow shearing in the clay solution to occur; (2) a region of obstacles allowing breaking impacts of the clay particles; and (3) a sudden lower pressure, yielding a dispersed clay solution having a fine and homogeneous distribution of clay particles in the clay solution; and

c) mixing the dispersed clay solution with at least a pristine epoxy.

### ***International Search Report***

11. The international search report cites one X-reference. However, this references does not read on the instant claims for the reasons set forth in the International Preliminary Report on Patentability.

### ***Allowable Subject Matter***

12. Claims 1-19 would be allowable if rewritten or amended to overcome the objection(s) set forth in this Office action.

13. The following is a statement of reasons for the indication of allowable subject matter:

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The prior art fails to reasonably teach or suggest the instantly claimed method or apparatus.

Powell (US Pat. No. 6,271,298) discloses a similar solution dispersion step/device for dispersion (*see column 3, lines 22-31*). However, the solvent (*water*) is removed prior to adding the epoxy materials (*see column 3, line 66 through column 4, lines 30, particularly column 4, lines 23-26*).

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***Communication***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/  
Primary Examiner, Art Unit 1796

March 1, 2010